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ABSTRACT

In reviewing innovative industrial arts curriculums and suitable methods for their adoption, this report presents the major objectives of 20 innovative programs in four categories: (1) integrative programs, (2) interpretation of industry programs, (3) occupational family programs, and (4) technology-oriented programs. Materials were gathered by computer and manual searches of Educational Resources Information Center (ERIC) publications and "International Dissertation Abstracts." After an analysis of the literature and a survey of curriculum alternatives, the report examines methods of achieving adoption of curriculum improvements, using consultants, supervisors, opinion leaders, and principals. An extensive bibliography, including reference materials determined by a computer search, is included. This report should be beneficial to change agents interested in implementing innovative industrial arts programs. (GEB)

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INDUSTRIAL ARTS CURRICULUM IMPROVEMENTS:

A Change Agent's Guide

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preface

This publication is designed to serve change agents interested in studying and implementing some of the recent industrial arts curriculum improvements. The compact nature of the review and its organization into guideline format should provide a ready reference for practitioners seeking to develop and improve industrial arts programs. Much has been written on the process of change and on industrial arts curricula. However, the author has been selective by citing references believed to be especially useful to change agents.

The profession is indebted to Emmett Mason for his scholarship in the preparation of this report. Recognition is also due to Dr. Ralph C. Bohn, professor of industrial studies, San Jose State College; Dr. Daniel W. Householder, chairman, School of Technology, Purdue University; and Dr. William Hull, research and development specialist at The Center, for their critical review of the manuscript prior to its final revision and publication. J. David McCracken, information specialist at The Center, coordinated the publication's development.

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Industrial Arts Curriculum Improvements: A Change Agent's Guide

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introduction

Literature and personal experience indicate a strong and urgent need for change among the practitioners concerned with industrial arts. This need is evidenced by efforts of professional groups to restate program objectives and by the efforts expended by local school and state curriculum committees to write and revise curriculum guides. The consideration given to facility planning by personnel in this field is further evidence that change is an integral part of the personality of industrial arts. It can be said with considerable assurance that planned change (planned innovation adoption) is part of the breath and life of intellectual activity in industrial arts. At certain strata it is also a part of the ongoing action program in this field, but this latter is not universal.

This document was prepared to help make the adoption of curriculum innovations universal in both the intellect and the action of individuals in the field of industrial arts. The primary goal is to bring about changes at the local school level. These changes must by their very nature involve the concerned personnel, the setting, and the curriculum, and this triad should always be kept in mind where educational changes are made. The setting or facilities, including buildings, equipment, and instructional media, will not receive attention here, however, because facility change requires large resources and is more difficult to effect. Because facilities are a function of previous curriculum and personnel decisions and changes, these topics should receive priority attention.

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statement of the problem

Historical treatments of the field of industrial arts reveal many efforts to produce curriculum changes. However, the adoption of new curriculums in industrial arts has been slow, as throughout all of education. Typically, the changes have come about as a result of an inspired teacher or committee of teachers who wanted change or who were encouraged to attempt change by local administrators or professional groups. These changes have always been constrained by existing facilities, suitable instructional media, and limited resources. Today, facilities are being changed more rapidly and resources are often plentiful.

In addition, the process of change in education has been given attention at both the research level and the grass roots level. A gradual attempt is being made to plan and control change in the educational context. Concepts related to change and the diffusion of change are being picked from other fields and adapted to the educational setting. Among these are the social interaction processes related to innovation diffusion, a specific form of cultural diffusion. These processes involve key people who advance the diffusion by their presence in the process, and they are often known as influencials, opinion leaders, change agents, or interventionists.

Schemes or models for educational change are being designed (Janowitz, 1971; Gillie, 1971). These proposed models are offered for use by students of educational change and interventionists who desire to plan and carry out changes that would not occur in a more natural fashion.

Within the field of industrial arts there are rather extensive discussions of innovative curriculums, several of which are now implemented. Some of these are limited in scope and application, while others are broad (Cochran, 1970; AVA, 1970). One author has characterized recent industrial arts curriculum changes as being of two kinds: (1) changes based on philosophical orientation and content organization, and (2) changes based on technological advances (Bohn, 1969). Another has classified them as "integrative programs," "interpretation of industry programs," "occupational family programs," and "technology-oriented programs" (Cochran, 1970).

The purpose of this document is to (1) summarize materials related to innovative industrial arts curriculums and (2) discuss methods suitable for achieving adoption of desired changes. It is not intended to be exhaustive but rather suggestive and helpful to persons interested in achieving adoption of some particular industrial arts curriculum innovation.

analysis of the literature

The following analysis has two major foci: (1) information on selected industrial arts curriculum innovations, and (2) selected methods or techniques for achieving adoption of innovations in education.

For the purposes of better communication, some terms must be defined or explained. "Innovation" is an idea, product, or practice perceived as new by an individual (Rogers, 1964). "Adoption" is the process of accepting or taking an innovation for use by oneself. "Change agents" are persons or groups who attempt change or aid in its accomplishment (Jones and others, 1968). "Change" is the planned or accidental adoption of an innovation. "Diffusion process" is the spread of an idea from its source to other persons (Rogers, 1964). "Dissemination" is a controlled process of communication to specific audiences for the purpose of creating a desired level of awareness (Simmons, 1968). "Opinion leaders" are those persons in a population whose opinions on a particular topic tend to influence other members of that population.

curriculum alternatives

Comprehensive efforts to discuss and describe curriculum innovations in the field of industrial arts are somewhat limited in number and have taken two directions. One of these, an in-depth analysis of 20 selected curricula and related program features, uses the generic term "industrial education" because some of the programs include vocational elements (Cochran, 1970). This analysis discusses the historical influences on the field of industrial education and is recommended reading for those who are interested in this background information. For those interested in a complete understanding of the history of this field, see Bennett (1926, 1937) and Barlow (1967). Lauda (1969) provides a discussion of contemporary forces which are acting on industrial arts. These sources are important for those readers seeking to identify contemporary innovations from earlier ones. A second analysis of industrial arts innovations summarizes 59 innovative programs classified as industrial arts (AVA, 1970). The AVA publication classifies the major settings of the programs at publication time as (1) elementary and secondary education, (2) special education, and (3) college and in-service education. This classification scheme should be considered somewhat arbitrary, however, since a junior high school-level curriculum development project which was being conducted at a university would be found in the last category despite the fact that its materials were being tested and demonstrated in junior high schools in several states. It should be pointed out also that there is an overlapping in these analyses (Cochran, 1970; AVA, 1970), and readers will find some programs discussed in both of these reviews.

Rather than combine the two analyses, they will be presented separately so that readers can benefit from the two perspectives. Cochran (1970) classified the 20 programs which he treated under four headings; these will be presented here.

Under the heading of "integrative programs," five programs were

identified. The programs aim toward making education a unifying experience rather than just a plan of unrelated and self-contained courses. These programs seek to eliminate course duplication and make it possible for students to (1) perceive relationships between different subjects, (2) make an easy transition from school to the world of work, (3) observe natural relationships within the field, and (4) obtain a realistic view of career development. They seek to unify students' activities or correlate subject matter. The program titles, location, grade level, and objectives of these programs follow:

1. Correlated Curriculum Project (New York City), Grades 9-12
   a. To provide exploratory experiences in the areas of business, health, and industry.
   b. To assist the marginal student in his adjustment to school and work.
   c. To provide the marginal student with marketable skills in one broad area of technology.
   d. To assist in job placement for those students who terminate their education at the end of high school.
   e. To provide work experience while attending school.
2. Interdisciplinary Vocational Education (Paola, Kansas), Grades 11-12
   a. To provide occupational information and job selection criteria.
   b. To provide guidance activities in self-assessment by students relative to their choice of a vocation.
   c. To provide experiences that will lead to preparation in a spespecific vocational field.
3. Introduction to Vocations (North Carolina), Grade 9
   a. To assist students in the development of a realistic self-concept and in an appraisal of their own characteristics.
   b. To help students gain a better knowledge, understanding, and appreciation of the changing employment patterns and opportunities in the world of work.
   c. To help students understand the basic processes of production, processing, and distribution in the American work economy and the importance of human relations and ingenuity in these processes.
   d. To acquaint students with the major occupational fields (including economic structure, organizational structure, specializations, relationships to other occupational areas, kinds of work involved, trends, and educational and other training requirements) in the world of work.
   e. To help students develop desirable attitudes toward work and to appreciate the dignity of every occupation.
4. The Partnership Vocational Education Project (Michigan), Grades 9-12 and teacher education

a. To provide each student with a meaningful educational program through a correlated sequence of experiences in English, mathematics, science, and industrial education.
b. To provide each student with a basic occupational orientation so he can assess his competencies and project his role in the world of work.
c. To develop in each student a degree of adaptability, flexibility, and adjustability so he can make an orderly transition from the classroom to a job, to another position, or continued professional development. (See also Minelli, 1965)

5. The Richmond Plan (Richmond, California), Grades 11-12
   a. To enable students to develop an understanding of the relationships between many curriculum areas.
   b. To correlate science, mathematics, English, and industrial laboratory experience.
   c. To emphasize communication skills.

Cochran also describes five programs under the heading, "interpretation of industry programs." The major concern of these programs is the interpretation of the totality of industry by including the study of marketing, production, materials, research and design, servicing, and industrial organization patterns. The program titles, location, grade level, and objectives follow:

1. American Industry Project (Wisconsin), Grades 8-10, teacher education
   a. To develop an understanding of these concepts that apply directly to industry.
   b. To develop the ability to solve problems related to industry. (See also Face and Flug, 1965; Nelson, 1968; Gebhart, 1968)

2. Functions of Industry (Detroit, Michigan), lower high school
   a. To provide exploratory experiences in interpreting industry in its totality. (See also Duffy, 1970; Lutz, 1967)

3. The Georgia Plan for Industrial Arts (Georgia), Grades K-12
   a. To develop insights and understandings of industry and technology.
   b. To develop an understanding of requirements, opportunities, and working conditions in technical and industrial fields.
   c. To develop an ability to use tools, materials, and processes to solve technical problems.

4. Industriology Project (Wisconsin), Grades 7-12
   a. To interpret industry to all students so they may be suitable citizens in an industrial society.
   b. To provide student experiences in solving industrially related problems.

c. To allow the student to create, design, and appreciate industrial products and methods.
d. To use the language of industry.
e. To apply education in practical and industrially related situations.
f. To develop a degree of skill and understanding in the use of tools, machines, materials, and processes of industry.

5. Orchestrated Systems Approach (Indiana), All levels
   a. To provide for a synthesized understanding of the broad spectrum of industry.
   b. To understand how society produces its goods and provides services important for building a good life for individual members of society.
   c. To sample adequate industrial experiences so that individuals can test and measure their potential talents and interests relating to production of goods and services.
   d. To provide product-producing experiences along with supportive skills and technical knowledge so that the existing relationships between the parts and the whole industry are understood. (See also Yoho, 1967)

The five programs discussed under "occupational family programs" take several approaches, but in general each assumes "youth should be knowledgeable about and should develop competencies utilized in broad occupational areas." These program titles, location, grade level, and objectives follow:

1. Crafts as a Vocation (Kentucky), All levels
   a. To provide opportunity for youth and adults to develop craftsmanship and tool skills.
   b. To motivate the student so that he will stay in school until graduation.
   c. To develop his creative potential.
   d. To develop his skill so he can work profitably in a craft area.
   e. To develop an appreciation of work in relation to craftsmanship, time requirements, proper procedures, safety habits, and cooperation with co-workers.

2. Galaxy Plan (Detroit, Michigan), Grades 7-12
   a. To provide each student with a more efficient opportunity to learn about the world of work.
   b. To provide each student with a better opportunity through actual laboratory experiences to choose the career he would like to follow.
   c. To provide every student (including full-time, college-bound and general students) with a manipulative skill that would be of immediate value to an employer.

3. Occupational, Vocational, and Technical Program (Pittsburgh, Pennsylvania), Grades 6-14
   a. To prepare young productive workers.
   b. To provide an educational program which would gain the attention of new industries in the area.
4. Occupational Work Experience (Warren, Ohio), Grades 8-12
   a. To provide occupational training to meet the needs of the less able student who cannot succeed in the regular vocational program.
   b. To limit the regular vocational program to those whose test scores indicate a chance for success.
   c. To guide a higher quality of student into vocational education.
5. Training for Families of Skills (Project ABLE, Quincy, Massachusetts), Grades 9-14
   a. To familiarize the student with possible occupational choices.
   b. To assist in the identification of an occupational area which interests the student.
   c. To develop knowledges and skills needed to gain initial employment.

Finally, Cochran identifies five "technology-oriented programs" which focus on contemporary industrial technology as the basis for industrial arts curriculums. The program titles, location, grade level, and objectives follow:

1. The Alberta Plan (Edmondton, Alberta), Grades 7-12
   a. To provide an environment where students can reinforce and apply the academic disciplines.
   b. To provide exploratory experiences in the various productive aspects of society.
   c. To provide a synthesizing educational environment.
   d. To provide an introduction to the multiplicity of career opportunities. (See also Ziel, 1966)
2. Industrial Arts Curriculum Project [1], Grades 7-8
   a. To create an understanding of the concepts, principles, generalizations, problems, and strategies of industrial technology.
   b. To develop an interest in, and appreciation for, industry as an integral part of the economic system that provides material goods for the satisfaction of human wants.
   c. To demonstrate knowledge and skills that will be useful in life situations of occupational, recreational, consumer, and sociocultural importance. (See also Towers, 1966, 1967; Ohio State University, 1966)

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[1] IACP materials are presently published by McKnight and McKnight Publishing Company, Bloomington, Illinois.

3. Industrial Arts: A Study of American Industry and Technology (Maryland), Grades 7-9
   a. To develop the individual's understanding of technological contributions.
   b. To develop the individual's understanding of contemporary industry.
   c. To develop the individual's ability to cope with the requirements of living in a technological era. (See also Maley, 1969)
4. Industrial Arts Technology: A Study of American Industry (Maine), Grades 7-12
   a. To develop in each student an insight and understanding of industry and its place in our society.
   b. To discover and develop student talents in industrial-technical fields.
   c. To develop problem-solving abilities related to the materials, processes, and products of industry.
   d. To develop in each student skill in the safe use of tools and machines. (See also Padham, 1965)
5. The Parma Approach (Parma, Ohio), Grades 7-9
   a. To develop in students an understanding of the growth and development of American industry.
   b. To develop in students an understanding of the functions of manufacturing industries.
   c. To develop in students the ability to solve problems related to the functions of manufacturing.

The Publications Committee of the Industrial Arts Division of the American Vocational Association appointed a special committee to "study and report the activities and programs currently under operation that were innovative in nature and promising for future program development and/or improvement." The committee's report provides a summary description of 59 such programs grouped into 14 categories (AVA, 1970).[2] These categories are presented with a brief description of the characteristics of programs listed under each heading. The first nine are elementary and secondary programs.

1. *Group Activity Project:* one program which involves two classes that build airplanes on a contractual basis with individuals.[3]
2. *Individualized Instruction and Independent Study:* five programs which involve sound-slide presentations, programmed instruction, learning activities packages, or block time-team teaching arrangements. (See also Brown, 1964; NYSED, 1965)

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[2] Available for $1.50 from Publication Sales, American Vocational Association, 1510 H Street, N. W., Washington, D.C. 20005. (Order No. 30570).

[3] A 28-minute color film will soon be released by the Aviation Distributors and Manufacturers Association. This film features such a program in Jackson, Michigan, and shows other schools' programs.

3. *Manufacturing and Mass Production:* nine programs organized on a student company or production line basis. (See also Lutz, 1967)
4. *Materials Fabrication and Testing:* one three-year conceptual and activity program focusing on materials, processes, and fabrication.
5. *Mobil Instructional Units:* one program utilizes a panel-type van and trailer to enrich local programs and provide expensive equipment on a rotational basis. (See also Schwaar, 1967; Siegel and Krane, 1971)
6. *Motivational Programs:* eight programs incorporating career guidance, family related concepts, subject matter correlation, work experience, and parent-child attendance for the purpose of changing pupil attitudes.
7. *Research and Development:* three programs which simulate industrial research and development techniques.
8. *Team Teaching:* one middle school program utilizing a team of industrial arts, art, and home economics teachers.
9. *Technology:* three technology based programs emphasizing creative problem solving, subject matter correlation, or conceptual and activity aspects. (See also Helen L. Buler School, 1968; Hunt, 1967)

The following six programs are for teacher education or special groups of students.

10. *Special Education:* two programs especially designed for physically and/or emotionally handicapped persons and mental retardates. (See also Blessing, 1962; Barron, 1966)
11. *Curriculum Reorganization:* fifteen programs operating for the purpose of curriculum, course development, or teacher education at universities.
12. *Methodology:* three programs utilizing multi-media, self-instruction, and single concept films.
13. *Teacher Preparation:* five programs using case study, educational or industrial internships, education course blocks, or variable credit major (40-60 hours).
14. *In-service Education:* two programs involving closed circuit television or evening classes at a technical institute.

Another publication of the American Vocational Association which promotes innovation in industrial arts curriculums is *A Guide to Improving Instruction in Industrial Arts* which provides a content structure and sets the following objectives for industrial arts (AVA, 1968).[4]

[4] Available for $1.25 from Publication Sales, American Vocational Association, 1510 H Street, N.W., Washington, D.C. 20005. (Order No. 201068).

Grades K-6

1. To support, enrich, and vitalize the academic curriculum and make general educational experiences more meaningful to the students.
2. To develop cooperative attitudes and self-reliance through problem-solving situations.
3. To develop an understanding and appreciation of the dignity of honest work.
4. To learn how to modify materials to meet students' needs by using elementary tools and materials.

Grades 7-9

1. To provide all students with the opportunity to explore industry and the world of work.
2. To provide opportunities for attaining knowledge of industrial vocations and related avocational pursuits and hobbies.
3. To improve the competence level of the students in regard to the choosing, buying, and using the goods and services of industry.

Grades 10-12

1. To provide adequately for basic instruction to meet the needs of at least three types of students: (a) students who wish to explore more deeply the avocational, cultural understanding, and consumer aspects of American industry, (b) students planning to pursue advanced study and careers in the areas such as the applied and technical sciences, and (c) those who will be entering the labor force before graduation or immediately after.
2. To provide practical situations dealing with the industrial world of work and provide understanding of the competitive nature of industry and business.
3. To provide basic skills which are useful in a variety of occupational adjustment.

For a discussion of methods for implementing the material in this guide see Kagy (1970).

Streichler (1970) provides a short analysis of the industrial arts N.D.E.A. Institutes for Advanced Study. These institutes were designed to introduce innovations and encourage the diffusion of these innovations at the teacher education level. Streichler also discusses selected curriculum development projects.

Cochran (1971) proposes a curriculum framework which could be of interest to those readers working for change in a total industrial education program. It would be of help if several innovative curriculums were being blended in one program.

methods of achieving adoption

Literature on education change tends to focus on change strategies, on the characteristics of educational personnel, or on organizational structure and climate. Some writers focus on particular roles or on all the roles in a particular school or set of schools. Others tend to be missionary in nature and suggest methods or strategies of effectively using and changing existing roles, structures, and personnel.

Consultants and Supervisors

One of the simplest methods suggested to achieve the adoption of curriculum innovations is to use an inside or outside consultant. A consultant should be viewed as a particular kind of change agent. One author recommends that the task of the consultant be extended beyond the initial stage, which only examines the local situation and makes recommendations, to a secondary stage of extensive involvement in the fixation activities related to the desired change (Keil, 1969).

In a field study conducted over a 17-month period two researchers acting as consultant-change agents organized a faculty cabinet and directed a school's staff in the learning of interpersonal skills. The faculty cabinet became a force in the school; its members were elected representatives from teacher and administrative subgroups. It became a "school-wide decision-making group" which brought about the following changes: (1) a communication pattern change from one that was primarily downward to one that was two-directional, (2) a shift in teachers' perceptions of administrative communications as being inaccurate and accepted to perceptions of these communications as being accurate and usually accepted, (3) a change in school decision-making practices from a unilateral orientation to a man-to-man orientation, (4) an increase from little staff teamwork to moderate staff teamwork, (5) an increase in responsibility among teachers for goal achievement, and (6) an increase in confidence and trust between teachers and administrators (Feitler, 1970; Blumberg, 1969).

This example of consultants operating for an extended time in an elementary school illustrates a comprehensive approach to several kinds of changes. The same tactic might apply as well to a subject matter staff or subgroup within a school or school district. The topic of change also might be curriculum innovation rather than decision-making. Consultant-initiated changes are possible also in the technical or work tasks which educational personnel perform. This is suggested by a source outside of education, however. An outside consultant worked with a supervisor in an insurance company to bring about the adoption and fixation of a planned change in the technical aspect of the supervisor's behavior. The focus here was on specific task changes of a technical nature rather than on the broad educational and motivational changes discussed earlier.

Personal support and interpersonal rewards successfully brought about the desired changes (O'Connell, 1966).

Thus we find consultants, who should be viewed as change agents, successfully working with an individual and a school staff over a period of time, bringing about both specific task-oriented changes and broad motivational and attitudinal changes. In these examples, the consultants were brought in from outside the organization, but certain inside consultants could probably bring about successful change also.

Roles which exist in an educational organization under the label of consultant or supervisor seem directly related to organizational efforts to change. These efforts include role-task definition and differentiation in the educational staff outside the faculty. Typically, supervisors have been viewed as administrators and not as change agents. In this context it should be noted that organizations should be concerned with increasing organizational change capacity as well as with accomplishing particular changes. These two activities should be kept separate (Biller, 1969). Increasing organizational change capacity should be given priority if continued change is an objective. This is necessary because change tactics often depend on the economics of time, choice of role, innovation focus, and intervention strategies (O'Connell, 1969). Organizational personnel must be aware of and be ready to deal with this reality whenever a change is appropriate and should not have to be completely readied and indoctrinated for each desired change. To help accomplish this, Doolittle (1970) urges: "We must toughen our concept of supervision so that it includes omsbudistic [*sic*] inspection and criticism." If this were actually done, the organization's change capacity would be increased, since the supervisor would be less concerned with supporting and administering ongoing programs and more concerned with nurturing change.

Gill (1969) and Keil (1969) suggest that innovation adoption and increasing complexity of staff roles are parallel. Gill (1969) and Wilkes 1970b) and it will be summarized here for those not familiar with it.
trators and specialists initiate innovations more frequently than teachers. Specialist-type roles require excellent organizational communication if these roles are to be well understood and if conflict with the intended role is to be eliminated (Williams, 1970).

Opinion Leaders

Inside consultants can be identified by methods suggested by research on opinion leaders. This research literature has been reviewed by Hensel and Johnson (1969), Parker (1969), and Bice (1970a, 1970b) and it will be summarized here for those not familiar with it.

Three techniques for identifying opinion leaders are (1) the sociometric technique, which involves asking people whom they consult for advice on a particular topic, (2) the key informant technique, which involves asking key people in an organization whom their subordinates

consult for advice on a particular topic, and (3) the self-designating opinion leadership technique, which involves asking people if others seek them out for advice on a particular topic. The latter method has not been found particularly useful (Hensel and Johnson, 1969). The other two methods involving the designation of persons whose opinions on a topic are sought or valued appear to be useful.

Opinion leaders can be important in a scheme involving planned change, in that they are already valued by peers for their present knowledge or behavior. Opinion leaders among teachers have been identified by Bice (1970b) as generally having these characteristics:

1. Opinion leaders are older than their peers.
2. Opinion leaders are usually in the 35-45 year age group.
3. Opinion leaders have had more total years of teaching experience.
4. Opinion leaders among teachers have taught for a longer period of time in their present job.
5. Opinion leaders among teachers are those who have enrolled in a greater number of in-service training programs.
6. Opinion leaders among teachers participate in more social and professional organizations and activities in their local communities.

These characteristics can be utilized by interested persons who seek to identify local opinion leaders among industrial arts teacher groups. Caution is urged in this connection, for the topic or area of expertise related to opinion leadership may be quite limited, i.e., the area in which a person is operating as an opinion leader may just be one part of the subject matter being taught, one particular talent, or one professional activity.

Teachers, and the opinion leaders among them, are part of the school system which employs them. The opinion leadership role appears to be a function of the school system and also involves the personality of the individual. Opinion leader teachers seem to be located in larger school systems which have (1) high per pupil expenditure, (2) teachers who engage in in-service programs, and (3) a teacher turnover rate of 10 to 15 percent annually (Bice, 1970b).

Rogers (1964) has enumerated several accepted facts about opinion leaders:

1. Opinion leaders conform more closely to social system norms than the average member.
2. The majority of research findings indicates there is little overlapping among different types of opinion leaders.
3. Opinion leaders use more impersonal, technically accurate, and cosmopolite sources of information than do followers.
4. Opinion leaders are more cosmopolitan than their followers.

5. Opinion leaders engage in more social participation than their followers.
6. Opinion leaders have higher social status than their followers.
7. Opinion leaders are more innovative than their followers.

A word of warning is in order here. The educational research on opinion leaders has been conducted with vocational agriculture and vocational home economics teachers as subjects and these teachers function in a more extensive organizational structure than do most industrial arts teachers. This organizational structure includes local, state, and national levels of personnel and financing which are unique to vocational education, and these seldom exert any influence on industrial arts personnel except where local organizational patterns lump them together with vocational teachers. Readers who tend to use older and less accurate terminology such as "manual training," "manual arts," and "shop" for industrial arts should be especially careful in examining the reality of industrial arts if it is administered, but not funded, in the vocational education matrix of the local organization. The nuances associated with terminology in industrial arts provide an endless source of problems to practitioners in the field and must be examined carefully by persons who seek to understand and utilize industrial arts opinion leaders.

Lionberger (1960) discussed the stages of the innovation adoption process:

1. Awareness—the first knowledge about a new idea, product, or practice.
2. Interest—the active seeking of extensive and detailed information about an idea, to determine its possible usefulness and applicability.
3. Evaluation—weighing and sifting the acquired information and evidence in light of existing conditions into which the practice would have to fit.
4. Trial—the tentative trying-out of the practice or idea, accompanied by acquisition of information on how to use it.
5. Adoption—the full-scale integration of the practice into the ongoing operation.

There is some evidence to indicate that teachers who are in these different stages are influenced by different sources (Christiansen and Taylor, 1966). This would probably be true for opinion leaders in industrial arts; if so, measures would need to be developed to ascertain the innovation adoption process stage once the opinion leaders were identified. Johnson (1969) suggests that visits to demonstration programs are powerful agents for affecting persons at the awareness and interest stages. Reid (1969) examined three mathematics innovations and found, with one exception, that colleagues, professional publications, and professional preparation were frequently used sources of information for teachers at any stage

on the innovation adoption continuum. In one case, professional preparation was not a key source for innovation at the adoption stage. This study revealed no differences in information sources between various educational and experience levels except for frequency of use of the same sources. The selection and use of effective industrial arts journals, elements of professional preparation, and the influence of colleagues seem appropriate for change at any stage. To affect teachers, particularly at the adoption stage, it seems necessary to provide them with support and help from superiors in their organization, for teachers generally are free to change only their methods of presentation and their student relationships. They are limited by their personality, conceptual skills, inquiry skills, and their ability for self examination, evaluation, and change (Johnson, 1969).

For those interested in influencing opinion leaders among teachers to bring about change, Bice (1970b) offers the following generalizations:

1. Opinion leaders use more technically accurate sources of information.
2. Opinion leaders use sources of information requiring only a small amount of personal time.
3. Opinion leaders are more cosmopolitan in nature.
4. Opinion leaders will turn to district supervisors and/or state supervisors as sources of information before they will turn to teacher educators.

He further suggests one- or two-day intensive workshops or seminars involving expert resource persons, other than teacher educators or supervisors, to introduce innovations. The expert and the innovation should be related to the opinion leader's area of interest and the program should be taken to the persons involved rather than having them individually travel long distances.

It seems logical from the earlier discussion of using consultants to establish innovations in a setting that the leaders of these workshops and seminars also should participate in activities following these exposures, such as establishing the proposed innovation with the opinion leader and helping him disseminate the innovation. This latter could include: (1) an overall selling approach, (2) specific information for other teachers, (3) methods for reaching the audience, and (4) techniques for implementing the change and publicizing it (Simmons, 1968).

Planned use of the opinion leader may tend to affect his leadership role and it would be well to consider this effect in any attempt to utilize the opinion leader as a more active change agent. It may be that effective opinion leaders are natural social phenomena which can be destroyed if attention is called to them. Their natural leadership may be more valuable than their use as a managed change agent. Recent literature reveals no studies of this effect, but it is obvious that the planned use of opinion leaders could result in altering teachers' perceptions of the opinion leader.

Principals

School principals are the object of many research studies which are concerned with change. In some, they are the subject studied to determine the organizational climate, and in others, their characteristics are the subject of study. The principal's position in the organizational structure makes him a highly visible person, one to whom teachers direct their expectations and frustrations. Griffiths (1959) suggests that few principals initiate change because of their place in the organizational hierarchy. However, because of their leadership position they should initiate change. This may be due to the fact that their attention is focused on the administration of ongoing programs rather than on the performance of leadership functions related to changing and improving educational programs.

R. O. Carlson is quoted by Johnson (1969) as describing schools as "domesticated organizations." Such organizations have a restricted need for and interest in change. They have needed no efficiency measures nor have they developed any. The rewards in general, and for innovation in particular, have been based on seniority and aimed at security. A lack of direction for innovation has stemmed from the ambiguity and immeasureability of the school's role and goal.

As the highest administrator in a school building, the principal is indeed in the middle of it. He can be a key figure in the change of his school's role or goal if that part of his change agent role is developed. An exploration of the characteristics of innovative principals should help if such role development is undertaken. Pratton (1969) studied innovative and uninnovative elementary school principals and found innovative principals (1) had higher social status, (2) adopted innovations earlier, (3) adopted more complex innovations, (4) were informed by cosmopolitan sources, and (5) were younger. Scofield (1969) studied a sample of innovative principals and found them to have less than five years experience in their present building and an administrative experience range of six to 14 years. Crain (1969) discovered a possible trend in centralized school districts for principals to discourage both innovations and teachers who did not agree with them; but these same principals made their faculty meetings a valuable educational experience.

Two studies examined the psychological characteristics of innovative principals. Monasmith (1969) found innovative principals to be significantly different from uninnovative principals on the Thrust, Consideration, Esprit, and Hinderance subtests of Halpin and Croft's *Organizational Climate Description Questionnaire,* Form IV. Using Cattell's *Sixteen Personality Factor Questionnaire,* Hinman (1967) found innovative principals scoring significantly higher on the "dominance," "enthusiasm," and "adventurous" factors. However, on the total profile she found no differences. She suggests the possibility of a positive linear relationship existing between "dominanceenthusiasm" and "innovation."

Kaplan (1969) studied chief administrators' perceptions of elementary principals who had less than three years experience or who had been in their present building less than three years. These perceptions indicated: (1) a great concern for initiating structure, (2) more identification with superiors than with peers and subordinates, (3) a task orientation rather than a personal orientation, (4) a more compliant and less autonomous attitude toward superiors, (5) helpfulness toward peers, and (6) among the new principals, a concern with supervision. Embree (1969) suggests that parental attitudes, leisure activities, self-image, and initiative are variables that distinguish potential innovators from non-innovators.

In another vein, Dillehay (1969) studied "local" versus "cosmopolitan" principals. Locals had higher organizational loyalty and their reference groups were within the organizational structure. On tne other hand, cosmopolitans had a stronger allegiance to professional skills and had reference groups which were external to their organizational structure.

We see here some differences between innovative principals and the opinion leaders discussed earlier:

1. Innovative principals tend to be young.
2. Innovative principals tend to be new to the principalship.
3. Innovative principals tend to be new to their building.

Both opinion leaders and innovative principals tend to be cosmopolitan, i.e., seek information and contacts outside the local organization and community.

After an extensive review of the literature, Tye (1970) enumerates nine conditions which must exist in the principal if he is to be an effective change agent. These are quoted below:

> *Condition one.* The principal gains self-understanding through an assessment of his own strengths and weaknesses, through a knowledge of how others see him, and through a knowledge of his own disposition to change.
>
> *Condition two.* The principal is aware of and able to deal with the many and often conflicting role expectations placed upon him by different groups—superordinates, subordinates, parents, and other principals.
>
> *Condition three.* The principal is aware of the components of effective leadership.
>
> *Condition four.* The principal has an understanding of the change process. He knows the kinds of behavior necessary to bring about change.
>
> *Condition five.* The principal is cosmopolitan. He looks outside for ideas rather than always inside his own system.
>
> *Condition six.* The principal is efficient in group dynamics.

Condition seven. Principals, with their teachers, can adequately define goals.

Condition eight. The principal has a background in recent administrative theory.

Condition nine. The principal is research literate.

In addition, he cites 11 manipulated conditions that the principal-change agent must effectively handle to bring about change. They are:

Condition one. The principal who wishes others to improve their skills should demonstrate that he, too, is continually attempting to improve his own.

Condition two. Individuals have different goals. If they are to work together effectively, they must determine cooperatively the direction of their efforts.

Condition three. As a change agent, the principal has a threefold responsibility related to decision-making. He must (1) monitor instructional decisions made by teachers, (2) provide a supportive atmosphere in which the decisions can be implemented, and (3) serve as a transactional agent between and among organizational levels and related decisions.

Condition four. Disequilibrium is a necessary condition of change.

Condition five. People change more easily when such change helps them solve problems which are real to them.

Condition six. People improve when they feel they are working in a situation that allows them freedom of trial.

Condition seven. Psychological static often gets between the sender and receiver of a message.

Condition eight. The use of power in a paternalistic or coercive manner can lead to acquiescence rather than to a desire for real change.

Condition nine. In creating a condition for change, the principal as a change agent should assess reasons for resistance on an individual basis and he should be able to deal with such resistance in a variety of ways.

Condition ten. Change can be brought about by adding forces in the direction of desired change or by diminishing opposing forces.

Condition eleven. It is more reasonable to identify problems carefully and to select and try alternatives in some type of priority order, concentrating on doing well whatever is undertaken at any given time.

This author also provides an extensive bibliography which should prove helpful to readers interested in the principal as a change agent whose goal is the adoption of industrial arts curriculum improvements.

summary statement

For persons interested in initiating change for the purpose of industrial arts curriculum improvement, the first step is to enter the awareness stage of the change process. The foregoing discussion of proposed and ongoing programs was directed to that end. It enumerated innovative programs and gave brief characteristics for the purpose of providing a rather inclusive picture of what is happening in this segment of education today. Programs ranging from elementary level to the college level are included. Many of them shade gently from general education to vocational education; others show more completely what is coming to be called occupational education, i.e., concerned from beginning to end with occupations and careers. Some of the programs exist merely as a course in a local school, while other programs have incorporated rather effective dissemination tactics which have resulted in their adoption in several other states. Some have been primarily concerned with applying a specific educational method while others have sought to serve a particular student segment. It is advisable to select from those which most closely match the hometown purpose. This eliminates much of the adaptation problems.

Once a curriculum improvement has been selected, methods of achieving adoption must be chosen and implemented. The latter portion of this document has focused on some of these. It has emphasized the use of a specialist, such as an outside or inside consultant or supervisor, opinion leaders among teacher or administrative groups, and the principal. These were chosen because the older change process which assumed individual teachers to be effective change agents has been too slow. Industrial arts curriculum improvements are numerous and we should get about the selection, adoption, and implementation tasks associated with using them.

description of the bibliography

Literature reviewed for this report includes that identified in computer searches of Educational Resources Information Center (ERIC) Materials, as listed in *Research in Education* (RIE), utilizing the following descriptors:

1.	Educational Change or Educational Innovation or Educational Development or Educational Improvement or Program Improvement or Program Development	and Industrial Arts or Industrial Education or Practical Arts
2.	Vocational Education	and Change Agents or Educational Change or Informal Leadership or Adoption or Changing Attitudes or Diffusion or Communication (thought transfer)
3.	Curriculum	and Industrial Arts or Industrial Education or Practical Arts

Additionally, a manual search of the ERIC *Current Index to Journals in Education* (CIJE) was completed using the following descriptors:

Change agents
or Adoption (ideas)

And a manual search of Volume 30A of *International Dissertation Abstracts* was completed using the following descriptors:

Acceptance	or Innovation
or Adoption	or Innovations
or Change	or Innovative
or Changes	or Persuasion
or Changing	or Resistance
or Diffusion	
or Dissemination	

The bibliography contains selected reference materials revealed by the computer search of *Research in Education* through June 1970, *Abstracts of Research and Research Related Materials in Vocational-Technical Education,* and *Abstracts of Instructional Materials in Vocational-*

Technical Education from Fall 1969 to Summer 1970. Also included are books, pamphlets, journal articles, and doctoral dissertations which were revealed by other literature search efforts. These items were used in the preparation of this publication but should be consulted directly for detailed information.

Bibliography[1]

(Boldface type indicates pages which cite the reference)

American Vocational Association. *Guide to Improving Instruction in Industrial Arts.* Washington, D.C.: American Vocational Association, 1968. 63 pp. (ED 024 814 MF $0.65 HC $3.29) **8**

.....*Innovative Programs in Industrial Arts.* Washington, D.C.: American Vocational Association, 1970. 36 pp. (ED 043 734 MF $0.65 HC $3.29) **1, 2, 7**

Barlow, Melvin L. *History of Industrial Education in the United States.* Peoria, Illinois: Charles A. Bennett Co., Inc., 1967. **2**

Barron, Lawrence, *et al. A Suggested Guide for Teaching Slow Learners in Industrial Arts in the Public Schools.* Augusta, Maine: State Department of Education, September, 1966. 42 pp. (VT 009 081, MF available in VT-ERIC Set ED 037 585) **8**

Bennett, Charles A. *History of Manual and Industrial Education Up to 1870.* Peoria, Illinois: Charles A. Bennett Company, Inc., 1926. **2**

.....*History of Manual and Industrial Education 1870 to 1917.* Peoria, Illinois: Charles A. Bennett Company, Inc., 1937. **2**

Bice, Garry R. *The Relationship of Group Structural Properties and Communication Behavior Patterns to Opinion Leadership Among Teachers. Final Report. Research and Development Series No. 41.* Columbus, Ohio: The Center for Vocational and Technical Education, The Ohio State University, 1970a. 85 pp. (ED 042 908 MF $0.65 HC $3.29) **11**

.....*Working With Opinion Leaders to Accelerate Change in Vocational-Technical Education. An Application of Research. Information Series No. 26.* Columbus, Ohio: The Center for Vocational and Technical Education, The Ohio State University, November, 1970b. 27 pp. (ED 044 502 MF $0.65 HC $3.29) **11, 12, 14**

Biller, Robert Paul. *Organizational Capacity for Change and Adaptation: An Exploration in a Public Research and Development Organization.* Doctoral dissertation, University of Southern California, 1969. (Order No. 70-341) **11**

Blessing, Kenneth R. *A Potpourri of Ideas for Teachers of the Mentally Retarded.* Madison, Wisconsin: State Department of Public Instruction, 1962. 94 pp. (ED 010 922 MF $0.65 HC $3.29) **8**

---

[1]Bibliographical entries followed by an ED number in parenthesis are generally available in hard copy or microfiche through the Educational Resources Information Center (ERIC). This availability is indicated by the abbreviations, MF for microfiche and HC for hard copy. Order from ERIC Document Reproduction Service (EDRS), Leasco Information Products Company (LIPCO), 4827 Rugby Avenue, Bethesda, Maryland 20014. For all orders, add $0.50 handling charge and sales tax appropriate to the state where the order is originated. Foreign orders must be accompanied by a 25 percent service charge, calculated to the nearest cent. Payment must accompany orders totaling less than $5.00. Items with ED numbers only are available from the publisher. Items with VT numbers are available in the VT-ERIC microfiche set listed. Dissertations with order numbers are available from University Microfilms, Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48106.

Blumberg, Arthur, *et al.* "The Elementary School Cabinet: Report of an Experience in Participative Decision Making." *Educational Administrative Quarterly,* Autumn, 1969. **10**

Bohn, Ralph C. "Inservice Education: Vehicle for Change in Industrial Arts." *American Vocational Journal,* Vol. 44, No. 9 (September, 1969). **1**

Brown, Robert M. *African Music Speaks, No. 6—Project CUE, A TV Utilization Sheet.* Albany, New York: State Education Department, 1964. 43 pp. (ED 003 790 MF $0.65 HC $3.29) **7**

. *Project CUE, Insights.* Albany, New York: State Education Department, 1964. 18 pp. (ED 003 792 MF $0.65 HC $3.29)

Brown, Robert M., *et al. CUE (Culture, Understanding, Enrichment)—English.* Albany, New York: State Education Department, 1964. 280 pp. (ED 003 785 MF $0.65 HC $9.87)

. *CUE (Culture, Understanding, Enrichment)—Home Economics.* Albany, New York: State Education Department, 1964. 227 pp. (ED 003 787 MF $0.65 HC $9.87)

. *CUE (Culture, Understanding, Enrichment)—Industrial Arts.* Albany, New York: State Education Department, 1964. 178 pp. (ED 003 789 MF $0.65 HC $6.58)

. *CUE (Culture, Understanding, Enrichment)—Science.* Albany, New York: State Education Department, 1964. 207 pp. (ED 003 788 MF $0.65 HC $9.87)

. *CUE (Culture, Understanding, Enrichment)—Social Studies.* Albany, New York: State Education Department, 1964. 200 pp. (ED 003 786 MF $0.65 HC $9.87)

Brown, Robert M , and Lacy, Grace N. *What Is Project CUE?* Albany, New York: State Education Department, 1964. 17 pp. (ED 003 791 MF $0.65 HC $3.29)

Christiansen, James E., and Taylor, Robert E. *The Adoption of Educational Innovations Among Teachers of Vocational Agriculture, A Digest of a Ph.D. Dissertation. Research Series in Agricultural Education.* Columbus, Ohio: Department of Agricultural Education, Ohio State University, June, 1966. 57 pp. (ED 016 783 MF $0.65 HC $3.29) **13**

Cochran, Leslie H. *Innovative Programs in Industrial Education.* Bloomington, Indiana: McKnight and McKnight Publishing Company, 1970. **1, 2**

. "Proposed: A New Curriculum Framework for Industrial Education." *School Shop,* Vol. 30, No. 5 (January, 1971). **9**

Crain, John Rudolpho. *Leadership Behaviors of Elementary School Principals as Perceived by Their Teachers and Superordinates in Centralized and Decentralized Districts.* Doctoral dissertation, University of Southern California, 1969. (Order No. 70-5204) **15**

Dillehay, James Aloysius. *An Analysis of the Relationship Between a Principal's Latent Organizational Identity and His Role-Expectations for the Principalship.* Doctoral dissertation, Bowling Green State University, 1969. (Order No. 70-5512) **16**

Doolittle, Lawrence W. "Supervisor as Ombudsman?" *Educational Leadership,* Vol. 27, No. 6 (March, 1970). **11**

Duffy, Joseph W. "Conceptualizing the Functions of Industry." *The Journal of Industrial Arts Education*, Vol. 29, No. 5 (March-April, 1970). **4**

Embree, James Edward. *The Relationship of Life Experience Patterns and Personality Factors Indicating Innovative Potential.* Doctoral dissertation, Utah State University, 1969. (Order No. 70-2434) **16**

Face, Wesley L., and Flug, Eugene R. F. *Development of a Conceptual Framework for the Teaching of Industrial Arts.* Menomonie, Wisconsin: Stout State University, January, 1965. 76 pp. (ED 003 847 MF $0.65 HC $3.29) **4**

Feitler, Fred, and Blumberg, Arthur. "Changing the Organizational Character of a School." *The Elementary School Journal*, Vol. 71, No. 4 (1970). **10**

Gebhart, Richard H. *Developing American Industry Courses for the Secondary School.* Menomonie, Wisconsin: Stout State University, March, 1968. 40 pp. (ED 031 594 MF $0.65 HC $3.29) **4**

Gill, Donald George. *The Relationship of Innovation and Complexity in Public School Systems.* Doctoral dissertation, University of Illinois, 1969. (Order No. 70-854) **11**

Gillie, Angelo C. "Diffusion of Knowledge, Research Findings and Innovative Practices in Educational Institutions." *Journal of Industrial Teacher Education*, Vol. 8, No. 2 (Winter, 1971). **1**

Griffiths, Daniel E. *Administrative Theory.* New York, New York: Appleton-Century-Crofts, 1959. **11, 15**

Helen L. Buler School. *Design for Learning 1967 Summer Institute of Technology for Children.* Marlton, New Jersey: Helen L. Buler School; New York, New York: Ford Foundation, Trenton, New Jersey: Division of Vocational Education, State Department of Education, 1968. (ED 036 609—Document not available from EDRS) **8**

Hensel, James W., and Johnson, Cecil H., Jr. *The Identification of Opinion Leaders among Teachers of Vocational Agriculture. Final Report. Research 40.* Columbus, Ohio: Center for Vocational and Technical Education, Ohio State University, June, 1969. 78 pp. (ED 030 764 MF $0.65 HC $3.29) **11, 12**

Hinman, Edna Fullmer. *Personality Characteristics of Clark County School District Principals Related to the Degree of Their Implementation of Innovation.* Doctoral dissertation, Utah State University, 1967. (Order No. 70-2448) **15**

Hunt, Elizabeth E. *Elementary Industrial Arts—Show Me the Way; "The Institute of Technology for Children."* Washington, D.C.: American Industrial Arts Association, 1967. 15 pp. (VT 005 837, MF available in VT-ERIC Set ED 036 657) **8**

Janowitz, Morris. "Alternative Models of Institutional Change in the Slum School." *Phi Delta Kappa*, Vol. 52, No. 6 (February, 1971). **1**

Johnson, David W. "Influences on Teacher's Acceptance of Change." *Elementary School Journal*, Vol. 70, No. 3 (December, 1969). **13, 14, 15**

Jones, Joseph H., Jr., *et al. Increasing Knowledge in Social Science among Agricultural Educators. Final Report.* Baton Rouge, Louisiana: Department of Vocational Agricultural Education, Louisiana State University, 1968. 71 pp. (ED 032 387 MF $0.65 HC $3.29) **2**

Kagy, Frederick G. "Practical Use of the Guide to Improving Instruction in Industrial Arts." *American Vocational Journal*, Vol. 45, No. 5 (May, 1970). **9**

Kaplan, Bert L. *An Analysis of Changes in the Adoptive Behavior of Elementary School Principals as Related to Their Lengths of Experience in One Building*. Doctoral dissertation, New York University, 1969. (Order No. 70-765) **16**

Keil, Ellworth C. "A Structure for Innovation in Education." *Educational Technology*, Vol. 9, No. 10 (October, 1969). **10, 11**

Lauda, Donald P. "In the Midst of Change." *Journal of Industrial Arts Education*, Vol. 29, No. 1 (September-October, 1969). **2**

Lionberger, H. F. *Adoption of New Ideas and Practices*. Ames, Iowa: Iowa State University Press, 1960. **13**

Lutz, Ronald J. "Functions of Industry in Action." *School Shop*, (June, 1967). **4, 8**

Maley, Donald. *The Maryland Plan for Industrial Arts in the Junior High School and the Behavioral Task Analysis Approach*. April, 1969. 40 pp. (ED 034 852 MF $0.65 HC $3.29) **7**

Minelli, Ernest L. *The Partnership Vocational Education Project, A New Program in Industrial-Technical Education*. Mount Pleasant, Michigan: Central Michigan University, 1965. 17 pp. (ED 012 313 MF $0.65 HC $3.29) **4**

Monasmith, James Milton. *Relationship of Selected Subtests of Organizational Climate Description Questionnaire to Educational Innovation in Selected High Schools in the State of Idaho*. Doctoral dissertation, University of Idaho, 1969. (Order No. 70-10684) **15**

Nelson, Orville. *The Evaluation System for the American Industry Secondary School Courses*. December, 1968. 37 pp. (ED 030 715 MF $0.65 HC $3.29) **4**

New York State Education Department. *Industrial Arts Humanities Media Guide: Cue*. Albany, New York: State Education Department, 1965. 117 pp. (ED 022 843 MF $0.65 HC $6.58) **7**

O'Connell, Jeremiah Joseph. *Managing Change: Planning and Controlling Organizational Change*. Doctoral dissertation, Columbia University, 1966. (Order No. 70-6701) **11**

Ohio State University. *Reading Assignment Outlines for Industrial Technology I, The World of Construction*. Columbus, Ohio: Ohio State University; Champaign, Illinois: Illinois University, August, 1966. 228 pp. (ED 013 956 MF $0.65 HC $9.87) **6**

Padham, Elwood. *Industrial Arts and Techno'ogy in Maine, A Study of American Industry. A Guide for Secondary Schools in Maine*. Augusta, Maine: State Department of Education, 1965. 361 pp. (ED 026 449 MF $0.65 HC $13.16) **7**

Parker, Frances Yoakam. *The Vocational Homemaking Teacher Opinion Leader as a Referent in the Communication of Change*. Doctoral dissertation, Ohio State University, 1969. (ED 030 767—Document not available from EDRS) **11**

Peter, Richard F., *et al.* "Industrial Arts Curriculum Project." *Journal of Industrial Arts Education,* Vol. 29, No. 2 (November-December, 1969).

Pratton, Donald LeRoy. *Selected Characteristics of Innovative Principals in the Milwaukee Elementary Schools.* Doctoral dissertation, Washington State University, 1969. (Order No. 70-5673) **15**

Reid, Isaiah. *Diffusion of Innovations in Elementary Schools: A Study of the Primary Sources of Information Used by Teachers.* Doctoral dissertation, Cornell University, 1969. (Order No. 70-529) **13**

Rogers, Everett M. *Diffusion of Innovations.* New York, New York: The Free Press, 1964. **2, 12**

Rowlett, John D. *Conference to Identify Broadened Roles for College and Secondary School Industrial Arts Programs in Appalachia and to Plan Pilot Educational Projects.* Richmond, Kentucky: Eastern Kentucky University, 1964.

Schwaar, Walter L. *Putting Industrial Arts on Wheels.* March, 1967. 4 pp. (ED 025 129—Document not available from EDRS) **8**

Scofield, Bill Harold. *A Study of Innovative Practices in Selected Comprehensive High Schools in Kansas.* Doctoral dissertation, University of Kansas, 1969. (Order No. 69-21480) **15**

Siegel, Herb, and Krane, Harry. "Curbside Shops for New York City." *Industrial Arts and Vocational Education,* Vol. 60, No. 3 (March, 1971). **8**

Simmons, Wilber G. *Dissemination Guidelines.* Urbana, Illinois: University of Illinois, 1968. **2, 14**

Southern Illinois University. *An Approach to Occupational Education, Reading on Enterprise: Man and Technology.* Carbondale, Illinois: Faculty of Technical and Industrial Education, October, 1969.

Streichler, Jerry. "Curriculum Concepts and Courses: Directions for Teacher Educators." *The Journal of Industrial Arts Education,* Vol. 29, No. 3 (January-February, 1970).**9**

Towers, Edward R. *An Industrial Arts Curriculum Project for the Junior High School.* Columbus, Ohio: Ohio State University, January, 1967. 42 pp. (ED 013 949 MF $0.65 HC $3.29) **6**

Towers, Edward R., *et al. A Rationale and Structure for Industrial Arts Subject Matter.* Columbus, Ohio: Ohio State University Champaign, Illinois: Illinois University, November, 1966. 382 pp. (ED 013 955 MF $0.65 HC $13.16) **6**

Tye, Kenneth. "The Principal as a Change Agent." *National Elementary Principal,* Vol. 49, No. 4 (February, 1970). **16**

Wilkes, Sam Toland. *A Study to Determine the Relationship Between Selected School Organizational Climates and the Adoption of Innovations.* Doctoral dissertation, Auburn University, 1969. (Order No. 70-1710) **11**

Williams, Billy Ray. *The Curriculum Specialists of the Utah State Department of Education: Role Perception by Alter Groups.* Doctoral dissertation, University of Utah, 1970. (Order No. 70-6312) **11**

Yoho, Lewis W. *The "Orchestrated System" Approach to Industrial Education (Industrial Arts—Technical—Vocational).* Terre Haute, Indiana: Indiana State University, 1967. 46 pp. (ED 020 317 MF $0.65 HC $3.29) **5**

Ziel, H. R. *Industrial Arts in General Education. Research Report I.* Edmonton, Alberta: Department of Industrial Arts and Vocational Education, The University of Alberta, 1966. 23 pp. (VT 003 035, MF available in VT-ERIC Set ED 028 305) **6**

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